

REMARKS

Claims 1-9 are pending in the present application. Claims 1, 3, 4, and 7 are amended above. New claims 10-24 are added above. No new matter is added by the claim amendments or new claims. Entry is respectfully requested.

Claims 1-3 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Jeuch (U.S. Patent No. 4,851,365). Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeuch, in view of Baker, *et al* (U.S. Patent No. 4,852,062, hereinafter "Baker"). Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeuch, in view of Lee (U.S. Patent No. 5,073,513). Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeuch, in view of Lee, and further in view of Chen (U.S. Patent No. 6,291,297) and Kapoor (U.S. Patent No. 5,498,558). Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeuch, in view of Mitchell, *et al* (U.S. Patent No. 5,120,672). Reconsideration and removal of the rejections, and allowance of the claims are respectfully requested.

Independent claim 1 as amended above is directed to a method of fabricating a non-volatile semiconductor memory device. A charge storage layer is formed on a substrate. A control gate layer is formed on the charge storage layer. A gate mask in the shape of a spacer is formed on the control gate layer. The charge storage layer and the control gate layer are removed to expose a top portion of the substrate. The gate mask protects a portion of the charge storage layer and the control gate layer, allowing a control gate and a charge storage region to be formed. A conductive region is formed in a top portion of the substrate. A source-side insulative spacer is formed on the top portion of the substrate adjacent a sidewall of the control gate and the charge storage region. A source electrode is formed on the conductive region. The source electrode is electrically isolated from the control gate and the charge storage region by the source-side insulative spacer. A top of the source electrode is at the same level as, or below, a top portion of the gate mask.

In the present invention as claimed in amended independent claim 1, a "source electrode"

(see, for example, element 530 of Fig. 7F) is formed “on the conductive region” (see specification, page 14, line 19 - page 15, line 1). The source electrode is formed such that a top of the source electrode is “at the same level as, or below, a top portion of the gate mask” (see, for example, Fig. 7F, top of source electrode 530 is below top of gate mask 526). Also, a “source-side insulative spacer” is formed “...adjacent a sidewall of the control region and the charge storage region” (see, for example, Fig. 7F, insulative spacer 528 formed adjacent a sidewall of the control gate layer 512 and charge storage layer 510 (eventually formed as shown in Fig. 7H as the control gate 512' and charge storage region 510')). In addition, the “source electrode” is “electrically isolated from the control gate and the charge storage region by the source-side insulative spacer” (see, for example, Fig. 7F, insulative spacer 528 isolates source electrode 530 from control gate layer 512 and charge storage layer 510).

It is submitted that Jeuch fails to teach or suggest the present invention as claimed in independent claim 1. Specifically, Jeuch does not teach the formation of “a source electrode on the conductive region.” With reference to FIGs. 4e - 4h of Jeuch, layer 124 formed on source region 122 is an insulative layer, and therefore does not function as a conductive electrode, as claimed. Moreover, since Jeuch uses an insulating layer instead of a source electrode, a source-side insulative spacer is not required. Therefore, it is submitted that Jeuch fails to teach or suggest “forming a source electrode on the conductive region, wherein the source electrode is electrically isolated from the control gate and the charge storage region by the source-side insulative spacer, and wherein a top of the source electrode is at the same level as, or below, a top portion of the gate mask” as claimed in amended independent claim 1.

Independent claim 1 is amended above to include certain limitations from former dependent claim 4. As stated above, former dependent claim 4 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Jeuch, in view of Baker, *et al* (U.S. Patent No. 4,852,062, hereinafter “Baker”).

It is submitted that the combination of Jeuch and Baker fails to teach or suggest the

present invention as claimed in amended independent claim 1. Specifically, the combination of Jeuch and Baker fails to teach “forming a source electrode on the conductive region, wherein a top of the source electrode is at the same level as, or below, a top portion of the gate mask.” Instead, as stated above, Jeuch teaches the formation of an insulating layer on the source region, while Baker teaches the formation of a metal layer 78 and vertical contacts 76 that are formed over the source/drain regions 68, 70, 72 (see Baker, Fig. 12, and column 8, lines 20-23). It is therefore submitted that Baker, whether alone, or in combination with Jeuch, fails to teach or suggest the formation of a source electrode having a “top” that is “at the same level as, or below, a top portion of the gate mask,” as claimed in amended independent claim 1.

It is submitted that Jeuch and Baker, taken alone or in combination, fail to teach or suggest the invention set forth in amended independent claim 1. Allowance of claim 1 is therefore respectfully requested. With regard to dependent claims 2-11, it follows that these claims should inherit the allowability of the independent claim from which they depend.


With regard to new independent claim 12, it is submitted that the cited references, taken along or in combination, fail to teach or suggest the combination of “...forming a source-side insulative spacer on the top portion of the substrate adjacent a first sidewall of the control gate and the charge storage region”; “forming a source electrode on the conductive region, wherein the source electrode is electrically isolated from the control gate and the charge storage region by the source-side insulative spacer”; and “forming a select gate on a second sidewall of the charge storage region” as claimed, for the reasons specified above. Entry and allowance of new claim 12 is respectfully requested. With regard to dependent claims 13-24, it follows that these claims should inherit the allowability of the independent claim from which they depend.

Closing Remarks

It is submitted that all claims are in condition for allowance, and such allowance is respectfully requested. If prosecution of the application can be expedited by a telephone conference, the Examiner is invited to call the undersigned at the number given below.

Date: April 19, 2004
Mills & Onello, LLP
Eleven Beacon Street, Suite 605
Boston, MA 02108
Telephone: (617) 994-4900, Ext. 4902
Facsimile: (617) 742-7774
J:\SAM\0203DIV\amendmenta.wpd

Respectfully submitted,


Anthony P. Onello, Jr.
Registration Number 38,572
Attorney for Applicant